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EXAMINER

VU, H

ART UNIT

PAPER NUMBER

2811

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Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

# Office Action Summary

Application No.

09/328,646

Applicant(s)

WANG ET AL.

Examiner

Hung K. Vu

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the corresponding address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 21 May 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-8, 11, 12, 15, 16, 19, 20 and 23-31 is/are pending in the application.
- 4a) Of the above claim(s) 1-8, 11, 12, 15, 16, 19 and 20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 23-31 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4, 11, 13. 6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION*****Election/Restrictions***

1. Applicant's election with traverse of Invention of Embodiment II, in Paper No. 10 is acknowledged. The traversal is on the ground(s) that the subject matter of each of the designated inventions is sufficiently related that a thorough search for the subject matter of each of the designated inventions would encompass a search for the subject matter of the remaining designated inventions, so that the search and examination of the entire application could be made without serious burden. This is not found persuasive because even though 35 USC 121 authorizes restriction of two or more independent and distinct inventions, the term "and" has long been understood as "or". The law has long been established that dependent inventions (frequently termed related inventions) may be properly divided if they are in fact "distinct" inventions, even though dependent. The term "distinct" means that two or more subjects as disclosed are related, for example as combination and subcombination, process and apparatus for its practice, process and product made, etc., but are capable of separate manufacture, use or sale as claimed, and are patentable (novel and unobvious) over each other (though they may each be unpatentable because of the prior art.) It will be noted that in this definition the term "related" is used as an alternative for "dependent" in referring to subjects other than independent subjects. See MPEP 802.01. Furthermore every requirement to restrict has two aspects, (1) the reasons (as distinguished from the mere statement of conclusion) why the inventions as claimed are either independent or distinct, and (2) the reasons for insisting upon restriction therebetween. See MPEP 808. Where the related inventions as claimed are shown to be distinct under the criteria of MPEP 806.05 (c-I) the examiner, in order to establish reasons for insisting upon restriction,

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must show by appropriate explanation one of the following: (1) separate classification thereof, (2) a separate status in the art when they are classifiable together, or (3) a different field of search. See MPEP 808.02.

The restriction requirement for Embodiment I and Embodiment II sets forth a two way distinction between the inventions of Embodiment I and Embodiment II. Therefore, the requirement for restriction between patentably distinct inventions of Embodiment I and Embodiment II is proper. See MPEP 808 and 808.02.

The requirement is still deemed proper and is therefore made FINAL.

2. Claims 1-8, 11-12, 15-16, 19-20 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected Embodiment, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in Paper No. 10.

### *Drawings*

3. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the substrate and the organic layer on the substrate which comprises a pattern of metal lines on the substrate and an organic dielectric on the substrate between the metal lines and an inorganic layer on the organic layer which comprises an inorganic dielectric having metal filled vias therethrough which connect to the metal lines of the organic layer, as recited in claim 23; an additional organic layer on the inorganic which comprises a pattern of additional metal lines on the inorganic layer and an organic dielectric on the inorganic layer between the additional metal lines and an additional

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inorganic layer on the additional organic layer which comprises an inorganic dielectric having metal filled vias therethrough which connect to the additional metal lines of the additional organic layer, as recited in claim 24; and one or more further alternating organic layers (c) and inorganic layers (d) on the additional organic layer (c) and inorganic layer (d), as recited in claim 25; further comprising an organic dielectric layer on the inorganic layer between the vias and under the additional metal lines of the additional organic layer, and an inorganic dielectric on the organic dielectric layer between the additional metal lines of the additional organic layer; as recited in claim 26; further comprising an organic dielectric on each one or more alternating inorganic layer (d) between the vias and under the additional metal lines of the one or more alternating organic layer, and an inorganic dielectric on the organic dielectric layer between the additional metal lines of the additional organic layer, as recited in claim 27; must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

#### *Claim Objections*

4. Claim 27 is objected to because of the following informalities: In claim 27, lines 2 and 3, before "alternating inorganic layer" insert -- one or more --, for clarity. Appropriate correction is required

#### *Claim Rejections - 35 USC § 102*

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

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(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

Claims 23 and 28-31 are rejected under 35 U.S.C. 102(b) as being anticipated by Numata et al. (PN 5,625,232).

Numata et al. discloses an integrated circuit structure which comprises a substrate and an organic layer on the substrate which comprises a pattern of metal lines on the substrate and an organic dielectric on the substrate between the metal lines and an inorganic layer on the organic layer which comprises an inorganic dielectric having metal filled vias therethrough which connect to the metal lines of the organic layer. Note Figures 3A-3C and 7 of Numata et al..

With regard to claim 28, Numata et al. discloses wherein the metal lines and vias have a barrier metal on one or more edges thereof.

With regard to claim 29, Numata et al. discloses a dielectric coated substrate which comprises;

A first dielectric composition film (118 or 116) on a substrate (112);

A second dielectric composition film (116 or 118) on the first dielectric composition film;

Wherein the first dielectric composition and the second dielectric composition have substantially different etch resistance. Note that because two films have different dielectric composition, it is inherent that they have substantially different etch resistance. Note Figures 5 and 8 of Numata et al..

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With regard to claim 30, Numata et al. discloses wherein the first dielectric composition film (116) is organic and the second dielectric composition film (118) is inorganic.

With regard to claim 31, Numata et al. discloses wherein the first dielectric composition film (118) is inorganic and the second dielectric composition film (116) is organic.

6. Claims 29-31 are rejected under 35 U.S.C. 102(b) as being anticipated by Jin et al. (PN 6,059,553) or Havemann et al. (EP 0805491A2, of record).

Jin et al. discloses a dielectric coated substrate which comprises;

A first dielectric composition film (110 or 120) on a substrate;

A second dielectric composition film (120 or Xerogel) on the first dielectric composition film;

Wherein the first dielectric composition and the second dielectric composition have substantially different etch resistance. Note that because two films have different dielectric composition, it is inherent that they have substantially different etch resistance. Note Figure 1 of Jin et al..

With regard to claim 30, Jin et al. discloses wherein the first dielectric composition film (110) is organic and the second dielectric composition film (120) is inorganic.

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With regard to claim 31, Jin et al. discloses wherein the first dielectric composition film (120) is inorganic and the second dielectric composition film (Xerogel) is organic.

Havemann et al. discloses the same claimed limitations. Note Figure 1e, 2d, and 3c of Havemann et al..

7. Claims 23 and 29-31 are rejected under 35 U.S.C. 102(e) as being anticipated by Cronin et al. (PN 6,143,640).

Cronin et al. discloses an integrated circuit structure which comprises a substrate (20) and an organic layer (24) on the substrate which comprises a pattern of metal lines (22a,22b) on the substrate and an organic dielectric on the substrate between the metal lines and an inorganic layer (26,42) on the organic layer which comprises an inorganic dielectric having metal filled vias therethrough which connect to the metal lines of the organic layer. Note Figures 1-15 of Cronin et al..

With regard to claim 29, Cronin et al. discloses a dielectric coated substrate which comprises;

A first dielectric composition film (24 or 26) on a substrate (20);

A second dielectric composition film (42 or 44) on the first dielectric composition film;

Wherein the first dielectric composition and the second dielectric composition have substantially different etch resistance. Note that because two films have different dielectric



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composition, it is inherent that they have substantially different etch resistance. Note Figure 15 of Cronin et al..

With regard to claim 30, Cronin et al. discloses wherein the first dielectric composition film (24) is organic and the second dielectric composition film (42) is inorganic.

With regard to claim 31, Cronin et al. discloses wherein the first dielectric composition film (26) is inorganic and the second dielectric composition film (44) is organic.

***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 24-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Numata et al. (PN 5,625,232).

Numata et al. discloses all of the claimed limitation except one or more additional organic layer on the inorganic which comprises a pattern of additional metal lines on the inorganic layer and an organic dielectric on the inorganic layer between the additional metal lines, and one or more additional inorganic layer on the additional organic layer which comprises an inorganic dielectric having metal filled vias therethrough which connect to the additional metal lines of the additional organic layer. However, Numata et al. discloses in Figure 8 that the multiple additional organic

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layers and inorganic layers having the claimed limitations can be formed. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the device of Numata et al.'s having the multiple additional organic layers and inorganic layers, as claimed, because this structure is convention to form in order to provide the integrated device with multiple circuits and functions.

9. Claims 24-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cronin et al. (PN 6,143,640).

With regard to claims 24-27, Cronin et al. discloses all of the claimed limitation except one or more additional organic layer on the inorganic which comprises a pattern of additional metal lines on the inorganic layer and an organic dielectric on the inorganic layer between the additional metal lines, and one or more additional inorganic layer on the additional organic layer which comprises an inorganic dielectric having metal filled vias therethrough which connect to the additional metal lines of the additional organic layer. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the device of Cronin et al.'s having the multiple additional organic layers and inorganic layers, as claimed, because this structure is convention to form in order to provide the integrated device with multiple circuits and functions. Note that Numata et al. (PN 5,625,232) is cited to support the well-known position.

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With regard to claim 28, Cronin et al. discloses wherein the vias have a barrier metal on one or more edges thereof. Cronin et al. does not disclose the metal lines also have a barrier metal on one or more edges thereof. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the device of Cronin et al.'s having also have a barrier metal on one or more edges thereof in order to prevent the impurities in the dielectric layers from diffusing into the metal lines.

### *Conclusion*

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hung K. Vu whose telephone number is (703) 308-4079. The examiner can normally be reached on Mon-Thurs 7:00-5:30, Eastern Time.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (703) 308-2772. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Vu

7/14/2001

Steven Loke  
Primary Examiner

